

The selection of animals to be fattened is no longer a haphazard matter. Farmers and graziers have learnt by experience that animals which fatten well possess certain points in common. Thus a good beef steer for fattening has a head with definite characteristics, which are thus set out by the author:—

"It should be broad and short, the face and cheeks should be full and deep with a broad, strong lower jaw. The nostrils should be large. The eyes should be large, prominent, and mild, indicating a quiet temperament. The forehead should be somewhat prominent, and covered with a mass of wavy hair. The ear should be of medium size, and covered inside and out with fine silky hair, and should be neatly attached to the head."

The other parts of the body have to be observed in similar detail. It would be interesting to inquire how far these "points" possess any real significance, and how far they are purely fanciful. Although the author does not help us in this matter, he has done good service by placing on record the points recognised in American practice.

(4) Mr. Johnson has gathered together in this little book—the only British book on the list—the main principles involved in tropical agriculture, with a view to the introduction of the subject into schools. He is convinced that West African youths must be encouraged to adopt agriculture as a profession if the immense potential agricultural wealth of the country is to be extensively developed; he considers that the unhealthiness of the climate must militate against the direct exploitation of the industry by Europeans. This being so, it is obviously necessary that the principles of agriculture should be introduced into West African schools, and the book is intended for this purpose. It begins with a chapter on soil, then with six chapters on the plant, dealing respectively with the seed, the root, the stem, leaves, the flower, and the fruit. Next follows an account of the food of plants, in which the author reverts once more to the soil. Two chapters on diseases and insect pests come next, and finally there is a section dealing with the school garden. The book is well got up, and is clearly written; it should serve very well the purpose for which it is intended.

THE POPULARISATION OF SCIENCE.

Harmsworth Popular Science. Edited by Arthur Mee. In 43 parts. (London: The Amalgamated Press, Ltd.)

THE days when Science was an intellectual preserve for the few are long since past, and popularisation has become an art—increasingly an art. For if we compare a work like that before us with the "Useful Information for the

People," or the "Science for All," or the "Popular Educator" of half a century ago, we cannot but admit that popularisation has made strides. The scope is more ambitious, bigger and deeper subjects are tackled; the mode of presentation is more interesting, which implies greater psychological skill; the style tends to be clearer, more vivid, less wordy; the illustrations are often extraordinarily educative; and the whole thing is more vertebrated. Sometimes it is the evolution-idea that gives unity to the treatment; sometimes it is an enthusiastic conviction that Science is for Man—to aid him to enter into his kingdom; more rarely the unifying aim is to work out a course of intellectual gymnastics—"a brain-stretching discipline."

Those who have listened to fine examples of popular lectures, such as some of the Evening Discourses at the British Association or at the Royal Institution, or who have read Huxley's or Tyndall's, must admit that sound popularisation is possible. If the lecturer has a deep first-hand knowledge of what he is talking about, if he has lucidity, vividness, the teacher's instinct, and a few more gifts and graces, what may he not achieve—as we have seen and heard—in the way of making even a difficult subject luminous to an average intelligence, and that without any lowering of the scientific standard? And if sound popularisation is possible, it is also for many reasons desirable. Knowledge is power: *savoir pour prévoir, et prévoir pour pouvoir*; its increase is an increase not of sorrow to well-constituted minds, but of interest and zest, alleviating what Shakespeare calls "life-harming heaviness"; and thirdly, no one can doubt that one of the most pressing social needs of the age is the better education of the wage-earners, and, of course, of the leisured class as well. Therefore we heartily welcome the extraordinary work before us, because it is sound popularisation, and sometimes reaches a very high level of success.

The book runs to more than 5000 pages, and it has twelve main themes. It tells of other worlds in space, of the making of the earth, of early forms of life, of the pedigree of plants, of the evolution of animals, of the ascent of man, of the laws of health, of the mastery of natural forces, of the rise of industry, of the development of commerce, of the history of society, and of the possible improvement of the race. It is, of course, sketchy, selective, and sometimes a little sensational, but it keeps to the facts, it is written with great skill, and it seems to us a big educational success. There is vitality and earnestness throughout, and the illustrations are exceptionally vivid and arresting. The numerous portraits of

scientific workers give a personal touch to the text. We have tried it on a boy of ten and a somewhat *blasé* reader of fifty, and both give the same verdict—that it is extraordinarily interesting. We should like to have seen the authors' names, and we should like to cut the parts and bring, let us say, all the Hygiene together; but these are minor matters. We wish this popularisation all success, because it is sound; and what are the factors in this soundness?

It appears to us that the chief desiderata in an educational enterprise of this sort are the following:—Getting contributors with the gifts and graces already alluded to, plus the crowning humility of taking pains and obeying the editor (to whom our compliments); the good sense not to pretend that everything is easy, since nothing thorough is; the critical faculty of discerning what can be presented accurately, and at the same time intelligibly, for while most true ideas are clear there is a clarity that only dazzles the man in the street; and, last, the restraint which forbids "giving to the ignorant, as a gospel, in the name of Science, the rough guesses of yesterday that to-morrow should forget." We do not mean to suggest that this huge work has all these virtues in perfection, but it has striven after them, and therefore we wish it well.

OUR BOOKSHELF.

Arabische Gnomonik. No. 1. By Dr. Carl Schoy. Pp. 40+2 plates. Aus dem Archiv der Deutschen Seewarte. (Hamburg, 1913.)

THIS mathematical account of Moslem dialling, by a writer already known for his studies of Arabic astronomy, forms one of the publications of the Deutsche Seewarte.

The author first touches on the bibliography. There is food for thought in the fact that but two references are given to English writers. The Arabic sun-dial differs from that of the Greeks in having a single point, at the apex of a spike, for index, in place of the gnomon. The horizontal dial is first treated, and rules are given for laying off "temporary hour-lines." These hours, duodecimal subdivisions of the daylight interval, vary in length; nevertheless, their inconvenience did not prevent their universal adoption until the time of Abu'l Hassan, who introduced equal hours about 1200 A.D. They are specially dealt with in the third chapter. The analysis of the clepsydra in this chapter gives *unequal hours*, since it assumes—erroneously—a constant rate of discharge.

Next follow two chapters on the determination of the Kibla and the times of prayer—sunset, nightfall, dawn, noon, and afternoon (asr). The last, with its various definitions, is discussed in some detail. The closing chapters concern vertical, cylindrical, and conical dials.

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Though leaning towards the academic in places (the author employs declinations of 36° , -69° , -45° , and 63° on p. 21), the work is of high interest and much utility to all who have to do with Moslem chronometry. A few typographical errors apart, it is well printed, but an index would have been a useful addition.

J. I. C.

Cotton Spinning. By W. S. Taggart. Vol. I. Including all Processes up to the End of Carding. Pp. xxxvi+262. Fourth edition. Vol. II. Including the Processes up to the End of Fly-frames. Pp. xiv+245. Fifth edition. (London: Macmillan and Co., Ltd., 1913.) Price 4s. net each.

THESE books have been brought up to date, and much new matter and many illustrations have been added. In all essential respects they resemble the previous editions, which have gained a wide circulation among students and practical cotton-spinners.

Modern Problems in Psychiatry. By Prof. Ernesto Lugaro. Translated by Drs. D. Orr and R. G. Rows. With a Foreword by Sir T. S. Clouston. Pp. vii+305. Second edition. (Manchester University Press, 1913.) Price 7s. 6d. net.

THE first English edition of Prof. Lugaro's book was reviewed in the issue of NATURE for January 6, 1910 (vol. lxxxii., p. 273). The present issue differs in no important respect from the former; a large number of minor changes, including the correction of several errors, have been made.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The Spectra of Helium and Hydrogen.

RECENTLY Prof. Fowler (Month. Not. Roy. Astr. Soc., December, 1912) has observed a number of new lines by passing a condensed discharge through mixtures of hydrogen and helium. Some of these lines coincide closely with lines of the series observed by Pickering in the spectrum of the star ζ Puppis, and attributed to hydrogen in consequence of its simple numerical relation to the ordinary Balmer series. Other lines coincide closely with the series predicted by Rydberg and denoted as the principal series of the hydrogen spectrum. The rest of the new lines show a very simple relation to those of the latter series, but apparently have no place in Rydberg's theory.

From a theory of spectra (*Phil. Mag.*, July, 1913) based on Rutherford's theory of the structure of atoms and Planck's theory of black-radiation, I have been led to the assumption that the new lines observed by Fowler are not due to hydrogen, but that all the lines are due to helium and form a secondary helium spectrum exactly analogous to the ordinary hydrogen spectrum. This view is supported by recent experiments of Mr. Evans (NATURE, September 4, p. 5), who observed the line 4686 in a helium tube not showing the ordinary hydrogen lines. Prof. Fowler (NATURE, September 25, p. 95), on the other hand, brings for-